

8. (amended) A logically-ordered, spatially-addressable array of different compounds, wherein each compound composing the array comprises a same common linear, branched or cyclic molecular core comprising at least three atoms of carbon, nitrogen, oxygen, phosphorus or sulfur, and [a] first [structural diversity element] and [a] second structural diversity elements, wherein the molecular cores have attachment points for the structural diversity elements, an ability to present the structural diversity elements in controlled varying arrangements, and an ability to be constructed in a rapid concerted fashion, said array comprising a first sub-array and a second sub-array, wherein the compounds composing the first sub-array each have the same first structural diversity element, [and] the compounds composing the second sub-array each have the same second structural diversity element, and the first and second sub-arrays are different.

10. (amended) A method of making a logically-ordered, spatially-addressable array of compounds having a same common linear, branched or cyclic molecular core structure comprising at least three atoms of carbon, nitrogen, oxygen, phosphorus or sulfur and at least two structural diversity elements, wherein the molecular cores have attachment points for the structural diversity elements, an ability to present the structural diversity elements in

controlled varying arrangements, and an ability to be constructed in a rapid concerted fashion, said array comprising at least a first sub-array and a second sub-array, wherein the compounds composing the first sub-array each have at least one common structural diversity element and the compounds composing the second sub-array each have at least one common structural diversity element, said method comprising the steps of:

- (a) providing a plurality of reaction vessels organized into the first and second sub-arrays;
- (b) adding reactants to each of the reaction vessels in a manner such that when reacted, the reactants form the compounds of the array, and such that the compounds composing each sub-array differ from one another by one change in a structural diversity element; and
- (c) reacting the contents of each reaction vessel under appropriate conditions to form the compounds of the sub-arrays in the logically-ordered array.

11. (amended) A method of making a combinatorial array of compounds, said method comprising the steps of:

- (a) apportioning into reaction vessels that are identifiable by their spatial addresses (i) a first plurality of compounds, each compound in the first plurality comprising a same first reactive group and a different first structural diversity element such that the compounds composing the first plurality differ from one another, with one first compound per reaction vessel; and (ii) a second compound comprising a second reactive group and a second structural diversity element, with one second compound per reaction vessel; and
- (b) reacting said first and second compounds under solution phase conditions wherein the first and second reactive groups react with one another by an addition reaction to form a compound, thus forming the combinatorial array of compounds;

wherein each compound composing the array comprises